South Fork Coeur d'Alene River Sediment Subbasin Assessment and Total Maximum Daily Load

May 17, 2002

6.0 Response to Public Comment

The South Fork Coeur d'Alene Sediment Subbasin Assessment and TMDL package went out for public review and comment on December 26, 2001 for a thirty-day period. The comment period was public noticed in three local papers: Shoshone News Press, Coeur d'Alene Press and Spokesman Review. The TMDL package was placed in three libraries (Wallace, Kellogg and Coeur d'Alene) identified in the public notices and the documents were made available electronically on the DEQ and Coeur d'Alene Basin Citizens' Advisory Committee (CAC) web sites. Upon request of three groups the comment period was extended an additional thirty-days to February 27, 2002. During the comment period public meetings to discuss the TMDL package were held with Shoshone Natural Resource Coalition Science Committee (January 7, 2001), CAC (January 9, 2001) and the Panhandle Basin Advisory Group (January 15, 2001). At the end of the comment period eight letters of comment were received which contained 87 distinct substantive comments. The comment resulted in 29 separate revisions of the subbasin assessment and TMDL.

A comment requested development of a reserve in the waste load allocation to account for future development. A reserve of 27 tons per year and 1.55 MGD was developed by a 10% reduction in the allocated waste load to the current permitted discharges. A white paper on the reserve creations was sent to the permit holders on March 29, 2002. A meeting on the issue was held with the permit holders on April 4, 2002. At the meeting and in two written communications the permit holders understood the value of a reserve to provide flexibility to the Silver Valley economy. Permit holders did voice some concern that the volume of their discharge would be curtailed up to 10% from existing permit limits.

A response to comment is organized into technical comment, those pertaining to social and legal issues, and text comments.

6.1 Technical Comments

Comment 1: The model is over conservative. It is not appropriate to use cumulative conservatism. It is probable that the real sediment levels is below 50% above background. Since valid water quality criteria already have a margin of safety any additional MOS simply compounds the inherent MOS in the criteria.

Response 1: The model is designed to estimate sediment based on estimations of the processes yielding sediment to a watershed. These are estimations and those estimations are designed to err in a conservative manner. The only assumption that provides a large single error is the extrapolation of a relationship built between cumulative watershed effects road score and sediment yield that was developed on more erosive granite terrain. This information is the best available and must be used. The result is a large conservatism in the estimates, however where actual in stream measurements have been made, these estimates and the model results compare relatively well (see Appendix A).

Comment 2: Even though DEQ staff indicated the need for modest sediment reductions for encroaching road and road crossings, given the large number of road crossings and miles of encroaching roads, the opportunity exists for numerous road closures.

Response 2: The document assesses the beneficial uses and the pollutant loads of the basin. The TMDL allocations set the sediment limits. An implementation plan that will be developed after subbasin assessment and TMDL EPA approves documents will decide how the sediment limits are to be met. The model certainly points to road crossings and encroaching facilities including roads as prime sediment sources. The implementation plan will plan how these sources will be further assessed and addressed. Road closure is not the only alternative as assumed.

Comment 3: Much of the sediment argument is based on lack of appropriate habitat and is not solely a roads issue. It is noted expert testimony from Steve Werner that included Post Falls Dam; railroad construction; highway construction, urbanization, logging, resource management (introduced species), natural conditions and EPA/DEQ contributions as other impacts.

Response 3: The subbasin assessment examines the state of the beneficial uses, the sediment impacts to the water bodies and the sediment loads. DEQ agrees that several other factors including metals concentrations affect the beneficial uses. However, the case is made that one of the factors is the pollutant of concern, sediment. This TMDL can only address this pollutant of concern, sediment, and not the many other factors. DEQ has been clear that restoration of the uses will require more than the sediment reductions estimated by the TMDL. DEQ urges that both remedial plans and TMDL implementation plans be broad enough to address many of these other impacts.

Comment 4: It is noted "young" (page 8) salmonids are found in the South Fork Coeur d'Alene River below Wallace.

Response 4: The term young used on page 8 was too generic. The more precise language "young of the year" has been inserted. DEQ agrees that juvenile trout are found below Wallace.

Comment 5: Exception was taken to Bull Trout extirpation and no bull trout streams found. It was pointed out that Superfund used this as a pretext for CERCLA action. Hecla is not aware of any evidence that bull trout are either native to or present in any of the areas addressed by the draft TMDL. Please provide evidence. (Page 8 Fisheries and aquatic fauna).

Response 5: The general view of fish biologists is that the South Fork Coeur d'Alene River was within the predevelopment range of the Bull Trout. Maclay (1940) reported bull trout present in tributaries to the South Fork Coeur d'Alene River. An earlier report, Ellis (1940) reported no fish in the main stream South Fork from Canyon Creek to the North Fork confluence. Since no individuals have been identified in the many electrofishing efforts in the South Fork and its tributaries, it is the general opinion of fish biologists that the species has

been extirpated from the watershed. We believe the assessment is accurate in terms of current bull trout distribution.

Comment 6: It is not appropriate to use 1990-1993 data for fishery. This data (p 26; Table 9) does not account for natural recovery. It seems likely new data would change conclusions and recommended course of action.

Response 6: More recent data from the USGS NAQW Program have been incorporated in the subbasin assessment, while older 1990 data is removed. The 1993 data was retained for comparison to 1998 DEQ data and 2000 USGS data. Comparison of 1993 to 1998 and 2000 data does not support the comment contention that the fishery is recovering in the South Fork below Wallace.

Comment 7: The data in Table 12 (page 30) are inadequate to establish sediment levels in stream. The state had inadequate funding for in-stream monitoring.

Response 7: The state is aware that inadequate funding is available to monitor sediment in-stream. This point is made on the bottom of page 30 and is the justification of the modeling approach. The data in Table 12 is used to compare with the model results and the differences in both estimates noted. A subbasin assessment and TMDL must use the best available data. Ignorance is no an excuse under regulation to delay development of the documents.

Comment 8: The model is nothing more than spreadsheet based on conservatism. There is no evidence of verification of model accuracy.

Response 8: Model verification is provided in the text by comparison to the data in Table 12 and by reference to measured values elsewhere in the basin; notably the North Fork Coeur d'Alene River (page 37; DEQ 2001c). Both measured and modeled values are estimates. The text compares the values in this light (page 37).

The model is run on an Excel spreadsheet platform. Many models use Excel and Access as convenient and publicly available platforms where all the calculations can be followed if the reviewer has the software. The Excel model runs are available upon request of DEQ.

Comment 9: The sediment model addresses only sediment yield not fate and transport. Many past actions have loaded sediment in the river. Sediment loaded from past actions and channelization are destabilizing the river. The TMDL must deal with the sediment load in-stream.

Response 9: The model estimates the sediment sources. It is generally acknowledged that plausible sediment fate and transport models are not available for this watershed. The fate and transport is not as important as the sediment yield. Only by removal of the load supply will the streams be able to use its stream power to effectively deal with the existing in stream load. TMDLs deal with load contribution to a water body, not the transport of the load from the water body.

Comment 10: Page 37 states the two pollutants (metals and sediment) impacts cannot be distinguished. It is no time to implement a new TMDL. Determine actual impacts first.

Response 10: The subbasin assessment makes the case that sediment as well as metals impair the listed water bodies of the South Fork Coeur d'Alene Subbasin. Metals do not contribute to loss of residual pool volume but sediment does. The statement in the subbasin assessment (page 37) correctly notes that basin wide these two pollutant impacts can not be segregated.

Further study as noted in the response to comment 9 is not an option the state has.

Comment 11: The data supporting model validation is not provided on page 34.

Response 11: These data are provided by comparison of Table 12 (page 30) with the model results and further by materials in Appendix A, where model results and measurements in the North Fork Coeur d'Alene watershed are provided. Although both in-stream estimates and modeled estimates are estimates these compare well. Where poor comparisons are found (Canyon and Ninemile Creeks; Table 12) the in-stream estimates are higher. The reasons these estimates are high are explained on page 37.

Comment 12: The comment disagrees with model assumptions of 100% delivery and road encroachment within 50 feet. It is stated that this makes the model even more conservative.

Response 12: Any model uses basic assumptions. The assumptions in the model including that noted in the comment were developed by a technical advisory group of hydrologists and sedimentologists representing state and federal agencies, companies and environmental groups. This and all other assumptions are the best professional judgement of the technical advisor group.

Comment 13: The background based on total acreage and hypothetical sedimentation estimations without detailed studies. It is inappropriate to issue this TMDL. Please release the detailed DEQ data for public scrutiny.

Response 13: The background sedimentation rate is based on a simple assumption of a fully forested watershed and the mean export coefficient for Belt Supergroup terrain. The U.S. Forest Service using monitored sediment data from research watersheds located in the Belt terrain develops these export coefficients. These watersheds have either low or no entry. These are the identical sediment yield coefficients used by the Forest Service, Idaho Department of Lands and private timber firms to model the impact of forest harvest projects. They constitute the best available information of sediment export per acre of forested lands. The watershed acreage is developed from referenced GIS coverages. DEQ believes these data provide the best estimate of background conditions.

Comment 14: Concern is stated that the model is biased against roads. The county is directly affected because many county roads are adjacent to streams. The county is uncertain how the TMDL will affect its future road maintenance responsibilities. If responsibilities are

increased and revenues (from forest harvest) decline how will the county address clean water responsibilities.

Response 14: We respectfully disagree that the model is biased against roads. The model has three modules that independently estimate sediment yield from land use, roads and direct bank erosion. The model was modified slightly in the South Fork to account for the infrastructure such as channelized stream, mining facilities, etc. It is true that road crossings and encroaching facilities (roads and others) were identified by the model as the major sources. This is because these features are in sufficient input numbers to drive the model.

Its should be noted that TMDL goal was adjusted upwards to address infrastructure in Silver Valley (towns, highways county roads). It is expected these features cannot be addressed without major social and economic disruption. EPA did not object to this adjustment.

Comment 15: The belief is stated that the TMDL should focus on flood prevention rather than roads. Floods often beyond the control of man cause the sedimentation.

Response 15: Large discharge events (floods) that the comment correctly identifies as part of the natural environment are the vectors of a great deal of sediment loading. The regulations and TMDL are however clear; sediment is the pollutant of concern not water or floodwaters. Some of this sediment loading is from natural sources during flood events. Additional loading is from man created sources. It is this sediment that the TMDL addresses.

Comment 16: Modeled results are used rather than real information and accepted science. Unrealistic demands are chosen legal goals rather than reasonable reachable objectives; legal and bureaucratic barriers prevent consideration and cooperation. This is a one dimensioned analysis with no consideration and coordination with local government.

Response 16: The reasons that modeled results are used are explained in the subbasin assessment (Sediment Modeling; page 30). The state does not have the funds or the time to use a monitoring approach. We respectfully disagree that sediment modeling is not a scientific approach. Quite to the contrary it uses scientific results developed locally (export coefficients) and elsewhere to estimate sediment yields. This is the same science and approach the Forest Service and IDL use to estimate the sediment impacts of timber sales. One outcome of good basic science is the ability to model, apply, and predict rather than to measure everything. In this case as with timber sales, it is the only cost and time effective approach.

The goal of the TMDL were purposely adjusted to account for Silver Valley infrastructure that will likely not be moved because the socioeconomic impacts would be too great. The goal is higher than the modeled export for some developed watersheds in the subbasin that have housing, roads and complete forest access and entry. For this reason we believe the goals are realistic.

Comment 17: The comment points out that the streams are in much better shape than they have ever been and that no additional steps should be taken to control stream sediment.

Nature can take care of any additional remediation given enough time. All work of DEQ and EPA in the Silver Valley should stop.

Response 17: We agree that the waters of the South Fork Coeur d'Alene River and many of its tributaries are in better condition than they have been since settlement of the area. We agree that this recovery is in part attributable to natural attenuation. However, we believe it is also in large part due to institution of wastewater treatment of human waste and mine waste in the 1970's and removal of many metals and sediment sources during the 1990's. The fact is that State and Federal law requires the waters to meet specific standards. The South Fork and many of its tributaries do not meet those standards. Since they do not and are not expected to in a reasonable time frame, State and Federal law require that pollutant load limits be set that when met are expected to meet the specific water quality standards. As a governmental agency, DEQ is required to comply with the law.

Comment 18: There needs to be reserve (waste load) allocation set aside for new point sources like mines. As written the regulation could prevent development of a new mine.

Comment 18: DEQ agrees. A reserve waste load allocation has been placed in the TMDL. This allocation is large enough for 1 source discharging at the permit limits of the Lucky Friday. This waste load was drawn from the point source by reducing the waste load allocated to each by 10%. This is justified because the permitted sources currently discharge 15.7% of the potential load provided them by the current permit limits.

Comment 19: The executive summary does not define a clear avenue to allow delisting in the future when fish and bug goals are met; when the river or large sections are no longer impaired.

Response 19: Language was placed in the executive summary (page xii) to clarify when the TMDL is met and the stream should be delisted.

Comment 20: The comment suggests a geologic model of erosion rates that indicates a much higher natural erosion rate than that used. A rationale for this approach is supplied.

Response 20: We find the geologic model interesting, but respectfully disagree that a geologic model of erosion rates is appropriate. Over the long span of geologic time, erosion rates have varied greatly. For example, when glaciers during the Pleistocene covered the Coeur d'Alene Mountains, erosion rates would have been quite high indeed. The base sediment yield rates used on forestland are developed by the Forest Service from actual sediment measurements made on watersheds with low levels of disturbance. We did modify the export coefficients to address erosion of unconfined tailings piles (higher values) and waste rock piles (very low values). These estimates were based on the best professional judgement of hydrologists familiar with the district.

Where we have had the opportunity to validate the model with actual measured estimates. These measured estimates and the model estimates are within the same range but as expected not the same.

Comment 21: A questionable procedure for determining the amount of dissolved metals in a water sample results in some of the mass reported in the dissolved category and the sediment (sic) category. This is double counting.

Response 21: Since the "dissolved metals" is a functional definition, (those metal bearings compounds and colloids capable of passing a 0.45 micron filter) some solids are indeed characterized as dissolved. Therefore, there is some double accounting in the estimates. However, with all due respect, the amount double accounted is infinitesimal as compared to the sediment loads in the basin. Sediment loads are in the range of 6-7 thousand tons. The error identified likely accounts for no more than a few pounds.

Comment 22: Concern is stated that the high discharge (rain on snow event) is not adequately addressed. Several studies are cited that were developed in other locations. It is argued that if the rain on snow event is the dominant factor in sediment transport the state should look for ways to reduce this factor. It is argues that rain on snow events have increased since the 1940's when timber extraction has occurred. It is argues trees and large brush increase transpiration and lessen runoff.

Response 22: Large discharge events, among these rain on snow events, are the major sediment transport events. The discharge these develop are not however the pollutant of concern. Sediment is the pollutant of concern and it is sediment yield that loads sediment to the system. It is important that sediment loading is decreased.

Analysis in adjacent watersheds indicated that the flood frequency and magnitude has not increased during the era of clear cutting (DEQ 2001c). This analysis used data from one station in the South Fork Coeur d'Alene River and two stations downstream. It appears based on this to be applicable to the South Fork. The flood frequency and magnitude analysis does not indicate the rain on snow event is a sediment source but it is certainly a loading mechanism from disturbed areas.

Although removal of transpirational demand increases discharge as stated, the increase is expressed in the base flow not during high discharge runoff.

Comment 23: Pre-and Post BMP projects are not distinguished by the model.

Response 23: We agree that pre and post BMP projects are not differentiated by the model. Information of this type for particular features on the ground is not available especially on private lands. The fact that features constructed under BMPs are not accounted for adds to the conservatism of the model predictions, it does not detract.

Comment 24: Sediment sources include 'mine waste piles" (Key Findings, page xi). It is argued that waste rock piles are not a sediment source. It is suggested that a table should be inserted to show that "mine waste piles" are a small source. A table of percent contribution from potential sources should be presented.

Response 24: Mine waste piles was broadly used in this summary and in the assessment. These included waste rock piles that were given low export coefficients and also unconfined tailings piles as those at the Success, the Highland Surprise and Douglas sites. Unconfined tailings piles were given high export coefficients, while waste rock piles were treated as forestland with insufficient forest cover (see page 33). The relative contribution of mine features as well as other landscape features is provided in Table 16 (page 34). The purpose of the statement in the Key Findings section is to list those features contributing to sediment yields. Mining features are among these sources. The language was clarified throughout the document to differentiate between mining features.

Comment 25: Notably absent from the list of sediment sources is material already in the streambed and banks of the floodplain (Key Findings, page xi). How can the monitoring provisions discussion page 53 mean anything if the monitoring is simply monitoring existing bed loads and deposited material?

Response 25: The model is dealing with sediment sources that yield to the stream system and not with the current load entrained in the stream or its floodplain. All TMDLs deal with pollutant in-stream by decreasing the pollution loading from point and nonpoint sources. The fact that pollutant is entrained in the system does not negate the requirement to control the sources. It is commonly accepted that if sources are controlled, excess sediment will be exported over time to achieve a new dynamic equilibrium.

Comment 26: Is low diversity of macroinvertebrates and low trout abundance documented in all 14 streams of the watershed (Key Findings, page xi)?

Response 26: Low trout densities are found in all the streams except Moon Creek; low macroinvertebrate scores are found in streams below mining impacts.

Comment 27: "A waste load allocation is provided at the level of the current permitted discharges." (Key Findings, page xi) Is this the permitted or the actual discharge level?

Response 27: This was at the current permitted levels. However, in response to two comments concerning the actual load for permitted sources (comment 38) and a comment requesting a waste load reserve for future growth (comment 18), this has been altered. In the analysis of the level of sediment discharge by point sources it was found to be 15.7% of that provided by the current permits. Creating a waste load allocation that reduced the potential load of each permitted source by 10% created a reserve. This freed up 47 tons per year and 1.55 MGD for the reserve. Since the permitted sources are discharging a little over 15% of the potential load permitted and this approach withdrew 10%, a buffer equivalent to 75% of the current potential load remains.

Comment 28: What is meant by "It is assumed that encroaching roads and mine facilities are proportional to the land area of these uses." (Key Findings, page xii).

Response 28: The sentence is intended to mean that the amount of encroaching forest road or mining facility is assumed to be proportional to the acreage in forest land or mining land use

for the purposes of the load allocation. The wording was clarified to indicate that for purposes of the load allocation, the amount of encroachment of a particular use (forest or county roads, mining facilities) is assumed proportional to the land area in these uses.

Comment 29: Habitat modification must be included as a limiting factor for trout population (page 17 first paragraph).

Response 29: Habitat alteration was added as a contributing factor for Canyon Creek. This section is listing the "pollutants of concern" for which the streams were listed. Canyon Creek is the only stream with habitat alteration listed.

Comment 30: The draft TMDL mentions data sources from the RI/FS used in the draft TMDL. Comments submitted by and on behalf of Hecla on the draft RI/FS are part of the public record and are incorporated here by reference (page 30, last paragraph).

Response 30: DEQ noted that Hecla's comments on the Coeur d'Alene Basin RI/FS are added as part of the public record.

Comment 31: The draft TMDL makes the assumption that metals levels in the streams are due solely to mining impacts. It is well known that natural levels of metals in mineralized areas can impair a fishery. Further DEQ has no evidence that such conditions did not exist in the areas prior to mining activities. DEQ does have evidence of metals on native streambed materials indicating high levels of metals in Canyon and Ninemile Creeks. Natural levels of metals must be recognized as potential sources of metals.

Response 31: Both DEQ and EPA acknowledge that metals concentrations in the mineralized area of the South Fork Coeur d'Alene watershed are greater than those encountered in non-mineralized areas. This issue is addressed in depth in the supporting documentation of the Coeur d'Alene Basin Metals TMDL. The most in depth study cited in the document indicates that metal concentrations were higher in the waters, but only by a small amount (Maest and Ralston 1999). For example the background level of zinc in the mineralized zone was in the range of 16 ug/L. Although higher than measured in non-mineralized zones, background metals concentrations pre-development are not estimated to be above the federal freshwater criteria or state standards.

Comment 32: For the different biological parameters used, there needs to be a frank discussion of the limitations and inaccuracies of these types of measurements (page 23 1st and 2nd bullets under "Biological and Other data").

Response 32: We agree these methods have limitations and that the reader should be aware of these limitations. We do not however want to bog readers down in an in depth discussion of these limitations. A notation of the limitations was made in the text with references to in depth discussions of limitations in EPA Rapid Bio-assessment and Water Body Assessment Guidance documents.

Comment 33: It is noted the descriptive information concerning sediment in the channel and floodplain of the river. It is argued that this is historic loading and that it is entirely possible that absent this historic loading the sediment sources would not be affecting the river (page 27 Sedimentation data).

Response 33: The historic sediment loading has impaired in part the beneficial uses of the South Fork and some of its tributaries. However, information developed from a rationale model of sediment yield indicates that current loading maintains this situation.

Comment 34: Riffle Armor Stability Indices (RASI) is only an indication of what is in the bed load not what is being added to the floodplain materials (Page 27).

Response 34: We agree that riffle armor stability only measures sediment in stream. It is used in the subbasin assessment to demonstrate in part the in-stream impairment of uses.

Comment 35: This measurement cannot be used to verify a sediment problem. The comparison to" reference streams" is meaningless since channelization is not fully considered (Pages 27-29 Residual Pool Volume).

Response 35: Residual pool volume is a valid measure of the impact of sediment (large grain size sediment) in filling pools. The comparison to reference streams is valid. Channelization is not a natural feature and is not exempt from scrutiny by the subbasin assessment. It is a factor that may not be altered due to overriding socio-economic reason. The sediment TMDL recognizes this fact and raises the TMDL goal accordingly to account for both the presence of channelization and infrastructure that cannot be altered economically.

Comment 36: The page 29 narrative on "Measured sediment load data speaks of actual measurements but the referenced Table 12 is "Sediment Estimates" Hecla concurs with DEQ criticism of measurements and cites more in its RI/FS comments (pages 29 & 30).

Response 36: This language was be clarified. The measurements made by USGS like all "sediment measurements" are indeed better characterized as estimates due to the state of the art of in-stream sediment measurement. The language "measured estimates" was used to make this differentiation.

Comment 37: - The TMDL discusses USGS "synoptic" sampling events. Hecla has attached comments on EPA's draft RI/FS questioning whether or not these sampling events were truly "synoptic" - please review these comments (page 29 last paragraph).

Response 37: In some aspects, Hecla's Remedial Investigation Report comments mirror DEQ's stated concerns about the USGS measured estimates of sediment for Ninemile and Canyon Creek during water year 1999.

Comment 38: The comment states dismay that the permit limits rather than the actual Discharge Monitoring Reports (DMR) were used to calculate the sediment load from the point sources. It is pointed out this adds to the conservative estimates (Page 31, Table 13).

Response 38: The permit limits were used because mill operation is currently at a very low level and the permit limits will be used for the allocation in any case. The actual DMRs were used in the final draft and note made of the actual permit limits loads for reference. Analysis did highlight the very small amount of the potential discharge that the wastewater treatment plants and the mills are actually using. Based on the documented low level of TSS discharge and the request by another comment that a reserve be created, 10% of the potential waste load created by the permits was removed from each point discharges waste load allocation and placed in a reserve of some 47 tons per year.

Comment 39: Exception is taken by the comment to mining features such as waste rock piles or tailing ponds being treated as encroaching roads (page 31 first paragraph).

Response 39: Where waste rock piles and tailing ponds encroach on the floodplain of a stream, these features function like roads by changing the stream gradient. These are hard features that are protected from erosion and thereby alter the stream's ability to come to natural gradient. In response the stream erodes banks and channels. The model accounts for this erosion.

Comment 40: The table does not appear to match the narrative. Are "mill tailings deposits" tailings ponds or historically discharged tailings on the floodplain (Page 33, Table 15).

Response 40: Mill tailings waste piles are tailings piles that are unconfined in a tailings pond. Some part of these are located in floodplains while others are not (i.e. Success Pile). The language was inspected for uniformity and changed if needed to "unconfined tailings."

Comment 41: The comment takes exception to the use of the Washington Forest Practices Board Guideline of 50% of natural background, while DEQ ignores Idaho sediment regulations (page 35).

Response 41: Since the Idaho sediment standard is narrative, it is appropriate to interpret it with other measures. The Washington Board of Forestry is the only regional published reference relating sediment yield with water quality standards. The subbasin assessment and TMDL use this reference as a screen and local modeled sediment yield from watersheds with low development as filters. It is the level of sedimentation from local watersheds with light development that are used as the final benchmarks.

Comment 42: The comment notes the episodic loading of sediment and asks how much of this is floodplain loading. The comment states that the annualized estimates of load grossly overestimates sediment load and asks if DEQ thinks it can control episodic loading. The point is made that episodic sediment loading is an act of God exempt from the CWA.

Response 42: The subbasin assessment correctly notes that sediment yield and transport is episodic. The sediment yield modeled is not from floodplain deposits but sediment loaded to the stream system. Since TMDL loading capacity and allocations are stated in mass per unit time, it is necessary to annualize the data based on the average return time of large discharge

events. The TMDL addresses sediment that will be loaded because of human influences. Just because the loading mechanism, the large discharge event cannot be controlled, it does not follow that sediment sources cannot be controlled. These sources in the form of unnecessary road crossings, encroaching roads and facilities or non-stocked forest acres can be controlled.

Comment 43: The comment notes the statement that the majority of the land of the subbasin is forest land and mined lands and refers to Figure 3; page 11. The figure does not show mined lands. From the information on page 49 mined lands are less than 0.1% of the land base. A table is suggested on page 49 to show the categories and percentage of the land base. Does the last sentence of this paragraph refer to mined and forest lands or town sites and roads? Hecla strongly disagrees if the former.

Response 43: The text used the term "mined lands" to refer to mine features. The comment correctly points out that mined lands are small. Nevertheless the impact of mine features (tailing ponds, unconfined tailings and mine infrastructure) are not small.

The reference to Figure 3 will be placed after forestlands. When the last sentence is viewed with the corrected language ("mine features"), we believe the final statement of the paragraph is correct.

Comment 44: Hecla understands that logging and forest fires "deforested a large part of the South Fork Subbasin and not smelter fumes. Smelter fumes helped prevent re-growth of forest (page 39, last bullet).

Response 44: Logging, forest fires and smelter fumes deforested the slopes in the vicinity of Kellogg. Live trees stood behind the zinc plant in the late fifties and sixties. In fairness the language will be changed to reflect all three caused deforestation while smelter fumes inhibiting re-growth of the forest.

Comment 45: Clarify that "tailings deposits" refers to historic tailings discharged to the floodplain and not tailings ponds (page 40, first bullet).

Response 45: The word" unconfined" was used to modify tailings. As stated earlier unconfined tailings are not restricted to the flood plain (See response to comment # 40).

Comment 46: Hecla is not aware of mine site roads that are a significant source of sediment. The locations and sediment data is requested (page 40 second bullet).

Response 46: Among the roads inventoried are some roads serving mine and mill sites. Roads serving mine facilities may at the same time be timber haul roads or county roads. Given the multiple use of roads the model did not attempt to segregate their use. The model did calculate the sediment yield from such road features based on the inventory. No monitored data was developed for the reasons outlined on page 30 of the subbasin assessment. The model data is available on a sub-watershed basis in Table 16 (page 34),

however the GIS coverage CDAROADS would require inspection in detail to identify mine site roads. This GIS coverage is available from DEQ or the Forest Service.

Comment 47: The draft TMDL states that a sufficient transport model has not been developed or identified yet the TMDL relies on modeled rather than monitored data.

Response 47: This is correct a sufficient sediment fate and transport model has not been developed. DEQ believes that the sediment yield model is sufficient and that sediment yielded is the sediment loading to the stream system.

Comment 48: It is noted that sediment values at Harrison are not valid for comparison to the South Fork (Model verification).

Response 48: The comment has identified an error in Appendix A. Data is available from the Enaville monitoring station on the North Fork. This model verification is appropriate for the South Fork. This error was corrected to reflect the analysis of the Enaville data.

Comment 49: A section on seasonal variations should be included.

Response 49: The seasonal variation section was developed and placed in the TMDL.

Comment 50: Provide citation on transport and downstream deposition of fine sediment to the Coeur d'Alene River. It would be helpful to include references to data and/or excerpts of modeling from the RI/FS to support the discussion of the transport and downstream deposition of fine sediment (Section 2 p.24-25, section 2.3).

Response 50: The subbasin assessment cites the Coeur d'Alene River Basin Study of NRCS and the USFS (USDA 1994).

Comment 51: Provide a brief discussion that demonstrates that combined reductions in sediment loading in the South Fork and North Fork Coeur d'Alene Rivers are sufficient to meet requirements in the approved TMDL for the main stem Coeur d'Alene River.

Response 51: The discussion developed for the North Fork sediment TMDL is applicable to the South Fork sediment TMDL. This discussion was placed in the TMDL.

Comment 52: Provide citation supporting conclusion that stream bank erosion is not a problem in Rosgen B channels. It would be helpful to include a citation to the GIS fieldwork, which supports the conclusion that stream bank erosion is not a problem in Rosgen B channel types (Section 2, p.31, paragraph 2, Section 2.3).

Response 52: A study commissioned by the SVNRT demonstrated that bank erosion of the Rosgen B channels primarily of the lower of SF Cd'A River is not a large factor. The Golder and Associates study (1999) is cited.

Comment 53: It appear that Moon Creek is anticipated to be delisted for sediment and that the unknown pollutant in the East Fork Ninemile Creek determined to be sediment. During the next 303(d) round the rationale and the data should be included to ensure appropriate evidence is available to support the listing change (page xi paragraph 2).

Response 53: Idaho has in its 303(d) listing process a mechanism to take the data and rationale from the South Fork Coeur d'Alene Sediment SBA and place these in the 303(d) listing process. The text will be corrected to state that metals also impair the East Fork Ninemile Creek.

Comment 54: Sediment yield exceeding 50% above background" should be changed to 61% based on the recalculation of point source contributions to sediment yield (Page xi paragraph 2).

Response 54: The language was changed to read "the sediment yield was modeled at 52% above background exceeding the 50% above background benchmark above which water quality impairment may occur". The assessment of point discharges based on the discharge monitoring records shifted the model from 61% to 52% above background.

Comment 55: Since adaptive management strategy approach is being used for sediment we recommend including a reference to reasonable assurance of TMDL implementation, section 5.4. (page xi paragraph 3). This will help provide the reader a complete picture of the adaptive management strategy.

Response 55: A reasonable assurance section is present in the TMDL. A reference to the reasonable assurance and its nature was made in the "Key Findings" section.

Comment 56: Do flood frequency and history indicate that clear cut logging practices have not altered the discharge frequency or magnitude (Section 2 p.21 paragraph 3 section 2.3).

Response 56: Analysis in adjacent watersheds (North Fork Coeur d'Alene River) indicated that the flood frequency and magnitude has not increased during the era of clear cutting. This analysis used data from one station in the South Fork Coeur d'Alene River and two stations downstream. It appears based on this to be applicable to the South Fork. See also response to comment 22.

Comment 57: Since an adaptive management approach is being used, we recommend that potential future actions be outlined, in the event that interim goals are insufficient to meet water quality standards. This discussion may be appropriate in the reasonable assurances section (Section 5 p.42, paragraph 1 section 5.1).

Response 57: Language was placed in the reasonable assurances section that indicates should the goal of full support not be met, the state will require an additional reduction of sediment load and reallocation based on this lower loading capacity. If this is not feasible for social or economic reasons, a use attainability assessment would be completed.

Comment 58: It would be helpful if you explain the basis of choosing trout density range of 0.1-0.3 trout per square meter as water quality progress (Section 5 p 42. Paragraph 1 , section 5.1).

Response 58: Language was added that demonstrates that 0.1-0.3 trout per square meter are found in streams of the Coeur d'Alene Basin fully supporting fishable populations.

Comment 59: The last line indicates that more refinement of the TMDL will be completed. We recommend these future actions be described in more detail (Appendix A p 77 paragraph 2).

Response 59: The text misunderstood. The section is dealing with the sediment model and its verification. Additional verification will occur as more measured estimate data becomes available. The TMDL would not likely change.

Social and Legal Comments:

Comment 1: The public comment period should not have coincided with the EPA proposed plan comment period. The comment states this is the same draft TMDL developed in 1997. Those concerned about road closures and private property rights have not been informed of the potential major impacts. A request is made that the comment period be extended to March 29, 2002. The comment period timing restricted the county's ability to respond to the sediment TMDL. The regulated community was not provided sufficient time to review and comment on the TMDL. The thirty-day extension granted was insufficient.

Response 1: The Department regrets that the comment period for the South Fork Coeur d'Alene Sediment TMDL overlapped with that of the Proposed Plan for the Coeur d'Alene Basin Metals Issues. However, the EPA provided a 120-day comment period from October 29, 2001 to February 26, 2002, while DEQ provided a 60-day comment period from December 26, 2001 to February 27, 2002. Even though both document are highly technical this is a considerable period for comment. The state's comment period was over twice that required by the Administrative Procedures requirements. The state is required to meet a court ordered schedule for TMDL completion. The South Fork TMDL is slightly behind that schedule due to the longer time frame provided for comment. In light of the court ordered schedule and the documents out for public review, DEQ provided as much time as feasible for public comment.

Comment 2: The Kootenai-Shoshone SCD should be more involved in the SBA and allocations.

Response 2: The Kootenai-Shoshone Soil Conservation District and its partners the NRCS and SCC have worked with DEQ on TMDLs in the past. Their involvement has been on agricultural lands and with bank erosion issues. These two issues are of little importance in the South Fork Subbasin, because no agricultural land is present and areas of bank erosion have been largely addressed along the streams. If the expertise of the District or its partners the NRCS and SCC is needed DEQ will turn to this valuable resource.

Comment 3: The concerned is expressed on behalf of ATV and off road vehicle users that TMDL will result in road closures. As a businessman that is dependent on multiple use, the writer is concerned about road and trail closures. If forest roads are closed (by the TMDL) forest harvest jobs will be lost. The process has no consideration for the impact to local economies.

Comment 3: The documents assess the beneficial uses and the pollutant loads of the basin. The TMDL allocations set the sediment limits. An implementation plan that will be developed, after EPA approves these documents, will decide how the sediment limits are to be met. The model certainly points to road crossings and encroaching facilities including roads as prime sediment sources. The implementation plan will clarify how these sources will be further assessed and addressed. Road closure is not the only alternative available to address these problem areas. Most often roads closed on state and federal lands are not forest haul roads but rather old roads typically not in this use. As decisions are made on roads in the implementation plan and resulting actions, the public use and interest in these roads will be one factor addressed.

Comment 4: There is little consensus on the positive effects of this TMDL. The State and EPA are setting local government up to fail.

Response 4: The TMDLs (South Fork Coeur d'Alene Sediment TMDL included) simply set the water quality load goals based on the water quality standards and the state of the water bodies. The implementation plan outlines those actions that will be taken to meet the load goals. This implementation plan can be fashioned by all involved to meet the public's water quality goals as well as the public's other numerous needs to live and work in the Silver Valley.

Comment 5: The Executive Summary at page x misrepresents the Congressional intent of the CWA in this manner is misleading and gives the impression of boundless authorities.

Response 5: DEQ disagrees it has misrepresented the intent and scope of the CWA. The stated objective of the CWA, set forth in § 101(a), is to restore and maintain the chemical, physical and biological integrity of the nation's waters. Water quality standards (WQS) established by states and tribes are required to, among other things, serve the purposes of the CWA, as set forth in Clean Water Act, § 101(a). See 33 U.S.C. § 1313(c), Clean Water Act, § 303(c); Idaho Mining Association v. Browner, 90 F. Supp.2d.1078 at 1080, 1087 (D. Id. 2000).

Comment 6: Executive Summary at page x - DEQ discusses the requirements of both a "list" and TMDLs required by CWA section 303(d).DEQ does not accurately reflect either the plain meaning or the Congressional intent of CWA Section 303(d). The law clearly directs two distinct and separate list and corresponding TMDLs (CWA Sections 303(d)(1) and (d)3). The comment argues that a TMDL under 303(d)(1) is only required for water impaired by point sources of pollutants.

Response 6: DEQ disagrees that 303(d)(1) only requires TMDLs for waters impaired by point sources. The court in Pronsolino v. Marchus, 91 F. Supp.2d.1337 (ND CA 2000) confirmed 303(d) requires TMDLs for waters impaired by nonpoint sources. See also 40 C.F.R. 130.2 and 130.7. Moreover, the Idaho state legislature has directed DEQ to develop TMDLs for point and nonpoint sources. Idaho Code § 39-3611.

Comment 7: Executive Summary, page x first paragraph - the draft TMDL states "For waters identified on the list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants , set at a level to achieve water quality standards" According to CWA 303(d)(1), the water quality standard must be "applicable". There is no "sediment" water quality standard "applicable" on either the state or federal level. The comment also argues that DEQ failed to comply with the state Administrative Procedures Act in establishing sediment criteria that can be used for the basis of a TMDL.

Response 7: DEQ disagrees there are no applicable criteria for sediment in the WQS. The CWA and federal regulations clearly authorize both narrative and numeric WQS. The Idaho WQS have a narrative criteria for sediment set forth in IDAPA 58.01.02.200.08. DEQ further disagrees with Hecla that the reference in the narrative criteria to the limitation on nonpoint source restrictions set forth in the WQS at § 350 means that there are no applicable sediment criteria. § 350.02 does not void the application of narrative sediment criteria or provide that there can be no violation of WQS with respect to nonpoint sources. To the contrary, this section provides the enforcement remedy and the process available when there is a violation of the criteria. Thus, this section provides, in part, the framework for TMDL implementation with respect to certain nonpoint source actions.

DEQ disagrees it has failed to comply with the Idaho Administrative Procedures Act in adopting the sediment criteria. The sediment criteria is part of the state WQS, which have been adopted as rules of the agency pursuant to and in full compliance with the provisions of the state Administrative Procedures Act.

Comment 8: Key Findings, page xi -is low diversity of macroinvertebrates and low trout abundance documented in all 14 streams of the watershed? These biological parameters are being used as *de facto* water quality standards- I.e. in an attempt to show that the applicable water quality standard is not being met. This is a direct violation of Idaho regulations at IDAPA 58:01.02 053 where the regulations state "These parameters are not to be considered or treated as individual water quality criteria or otherwise interpreted or applied as water quality standards. The comment also suggests that the use of biological parameters is a violation of the Idaho Administrative Procedures Act.

Response 8: DEQ disagrees that the use of biological parameters to determine support status on the South Fork Coeur d'Alene River is somehow a violation of § 053 of the WQS. This section directs DEQ to use aquatic habitat and biological parameters to determine whether uses for a water body are supported. This is consistent with the legislative mandate to use biological and aquatic habitat measures to determine support of uses set forth in Idaho Code §§ 39-3606 and 39-3607. DEQ did exactly what the Idaho Code and the WQS authorize.

DEQ also disagrees the use of biological parameters is a violation of the Idaho Administrative Procedures Act. The Idaho Code directs DEQ to make a determination of support status using such parameters. There is nothing in Idaho Code to suggest DEQ determination of support status must be done through a rule-making. Moreover, the TMDL itself is a plan for the achievement of WQS without the force and effect of law. Therefore, DEQ is not required to go through an Administrative Procedures Act rule-making when it develops the TMDL.

Comment 9: Key Findings, page xi -the draft TMDL states that "The sediment yield of the subbasins was modeled." This approach is not allowed by Idaho regulations. Regulations at IDAPA 58:01.02.200.08 for sediment requires that determination of impairment shall be based upon water quality monitoring and surveillance and the information utilized as described in Section 350. Hypothetical modeling is not authorized.

Response 9: Hecla bases this argument upon language in the narrative sediment criteria that states the following: "Sediment shall not exceed quantities specified in sections 250 and 252, or, in the absence of specific sediment criteria, quantities which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information utilized as described in § 350."

DEQ disagrees that it cannot use modeling to support a TMDL or to determine the support status of a water body. There is nothing in state law or the CWA that prohibits the use of modeling in TMDLs. The narrative criteria's reference to § 350 quoted above indicates the method DEQ should use and the remedies available for enforcement purposes when there is a violation of the sediment criteria. § 350.01b states that the failure to meet WQS for nonpoint sources is not a violation "for the purposes of enforcement." There is nothing in this section or in the narrative sediment criteria that provides there is no violation of WQS for purpose of placing a water body on the 303(d) list, and there certainly is nothing that restricts the use of modeling in the development of a TMDL.

Comment 10: Key Findings, page xi - the draft TMDL states: "The TMDL suggests residual pool volume as a surrogate measure of sediment for the purposes of implementation planning and monitoring" Idaho regulations do not allow for "surrogate" water quality standards at the locations cited in comment 8. Further monitoring is to occur at the nonpoint source for determining BMP effectiveness.

Response 10: DEQ disagrees that it can not use parameters such as pool volume to determine support status of water bodies. See response to legal comments 8 and 9.

Comment 11: Page 1 Introduction. The comment quotes a substantial portion of the first paragraph addressing the goal of the Clean Water Act. The comment takes exception with the language, provides corrected language and asks if DEQ is attempting to stretch the goal of the Clean Water Act. The comment states that DEQ is misstating the CWA by providing that water quality is judged by more than just water chemistry.

Response 11: DEQ disagrees with Hecla's comment. The CWA clearly states that the goal of the CWA is to maintain and restore chemical, physical and biological integrity of the nation's waters. CWA, § 101a. § 303(c) of the CWA also authorizes the use of biological monitoring and assessment and basing standards on such biological monitoring and assessment. Idaho state law also authorizes the Director to review the physical, chemical and biological parameters of a water body to determine the support status. Idaho Code §§ 39-3606 and 39-3607.

Comment 12: Background, First Paragraph - The draft TMDL language gives EPA much more authority under the CWA than the actual law provides. DEQ has conceded "primary" responsibility to EPA, which are actually reserved exclusively to the states by Congress in the CWA.

Response 12: DEQ disagrees with Hecla's comment. The introduction section referenced by Hecla continues with the following: "The Idaho Department of Environmental Quality (DEQ) implements the CWA in Idaho, while the EPA oversees Idaho and certifies the fulfillment of CWA requirements and responsibilities." DEQ has appropriately recognized the role of DEQ and EPA in water quality programs in Idaho.

Comment 13: Page 2 Idaho's role- the draft TMDL presumes anti-degradation is part of the water quality standard. Anti-degradation is a policy statement, not a standard.

Response 13: DEQ disagrees with Hecla's comment. The U.S. Supreme Court in PUD No. 1 of Jefferson County v. Washington Department of Ecology, et al., 114 S.Ct.1900 at 1905 (1994) confirmed that anti-degradation is one component of state WQS.

Comment 14: Page 2 Idaho's Role - the " modified" beneficial use is listed. With all the justification for this use being applicable to the areas affected by this draft TMDL, the applicability of the "modified" use should be discussed in detail.

Response 14: The modified cold water use is not the current designated beneficial use of the South Fork Coeur d'Alene or any of its tributaries. Any further discussion of this use is not relevant at this time. Should modified cold water use be designated, the TMDL would be subject to revision.

Comment 15: Page 25 Riffle Armor Stability Indices (RASI) is only an indication of what is in the bed load not what is being added to the floodplain materials. Again Idaho regulations require monitoring of the actual sediment nonpoint sources, which in turn leads to BMP modifications, if necessary.

Response 15: DEQ disagrees that RASI can not be used to determine the support status of the South Fork CDA River. Please see response to comments 7, 8 and 9.

Comment 16: Page 41 - DEQ cites federal regulation for the MOS rather than Idaho law that requires an "adequate" MOS and also directs that it be no more stringent than the CWA requires.

Response 16: DEQ agrees that both federal and state law require a MOS.

Comment 17: Page 41 Last paragraph - TMDL states "federal rules allow for "other appropriate measures" to be used " and EPA allows for "seasonal and annual loads." The comment objects to the deferral to federal authorities and to EPA rather than to Congress.

Response 17: DEQ agrees that both the CWA and EPA's implementation of the CWA provide for seasonal variations. DEQ's reference to EPA is appropriate because the TMDL must be submitted to and approved by EPA pursuant to the CWA.

Comment 18: Pages 42-48 The comment contents sections 5.1-5.3 are moot because DEQ has not set a modified use and has no numeric sediment standard. The comment concludes the TMDL is by law a 303(d)(3) TMDL.

Response 18: DEQ disagrees there are no applicable sediment criteria. Please see response to comment 7.

Comment 19: Page 49 "Reasonable Assurance" The comment asserts that this concept is not authorized by the CWA and is an attempt of EPA to circumvent the voluntary nature of the nonpoint source program established by Congress at Section 319 via a misrepresentation of the CWA at 303(d)(3).

Response 19: Reasonable Assurance is applied when a less stringent waste load allocation is provided based upon the assumption that a nonpoint source load reduction will occur. In such circumstances, reducing limits in point source discharge permits should be based upon an assurance that state WQS will be met through nonpoint source controls. According to EPA, reasonable assurance may be non-regulatory or incentive based. TMDLs in Idaho will continue to be implemented through the programs of designated agencies, many of which are voluntary with respect to nonpoint sources of pollutants.

Comment 20: Pages 55-67 Glossary The comment suggests a disclaimer should be added to clarify that where any of these terms are defined in either law or regulation, the legal definition takes precedent.

Response 20: The Glossary defines terms as used in the document and DEQ believes the terms are consistent with applicable law and regulations.

Text Comments:

Comment 1: Typographical errors were noted on pages 1 (county) and 82 ("average").

Response 1: These typographical errors have been corrected.

Comment 2: The maps are difficult to read.

Response 2: The maps have all been landscaped to make them larger and more readable.

Comment 3: It appears that the footnote under "b) Ninemile Creek-East Fork Ninemile Allocation be changed from Segment 3525 to segment 3524 (Ninemile Creek)(Section 5.4 p.51. Table 22).

Response 3: This typographical error was corrected.

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Glossary

305(b)	Refers to section 305 subsection "b" of the Clean Water Act. 305(b) generally describes a report of each state's water quality, and is the principle means by which the U.S. Environmental Protection Agency, congress, and the public evaluate whether U.S. waters meet water quality standards, the progress made in maintaining and restoring water quality, and the extent of the remaining problems.
303(d)	Refers to section 303 subsection "d" of the Clean Water Act. 303(d) requires states to develop a list of water bodies that do not meet water quality standards. This section also requires total maximum daily loads (TMDLs) be prepared for listed waters. Both the list and the TMDLs are subject to U.S. Environmental Protection Agency approval.
Adfluvial	Describes fish whose life history involves seasonal migration f from lakes to streams for spawning.
Alluvium	Unconsolidated recent stream deposition.
Ambient	General conditions in the environment. In the context of water quality, ambient waters are those representative of general conditions, not associated with episodic perturbations, or specific disturbances such as a wastewater outfall (Armantrout 1998, EPA 1996).
Anthropogenic	Relating to, or resulting from, the influence of human beings on nature.
Anti-Degradation	Refers to the U.S. Environmental Protection Agency's interpretation of the Clean Water Act goal that states and tribes maintain, as well as restore, water quality. This applies to waters that meet or are of higher water quality than required by state standards. State rules provide that the quality of those high quality waters may be lowered only to allow important social or economic development and only after adequate public participation (IDAPA 58.01.02.051). In all cases, the existing beneficial uses must be maintained. State rules further define lowered water quality to be 1) a measurable change, 2) a change adverse to a use, and 3) a change in a pollutant relevant to the water's uses (IDAPA 58.01.02.003.56).
Aquatic	Occurring, growing, or living in water.

Aquifer	An underground, water-bearing layer or stratum of permeable rock, sand, or gravel capable of yielding of water to wells or springs.
Assemblage (aquatic)	An association of interacting populations of organisms in a given water body; for example, a fish assemblage, or a benthic macroinvertebrate assemblage (also see Community) (EPA 1996).
Assimilative Capacity	The ability to process or dissipate pollutants without ill effect to beneficial uses.
Bedload	Material (generally sand-sized or larger sediment) that is carried along the streambed by rolling or bouncing.
Beneficial Use	Any of the various uses of water, including, but not limited to, aquatic biota, recreation, water supply, wildlife habitat, and aesthetics, which are recognized in water quality standards.
Beneficial Use Reconnaissance Program (BURP)	A program for conducting systematic biological and physical habitat surveys of water bodies in Idaho. BURP protocols address lakes, reservoirs, and wadeable streams and rivers.
Best Management Practices (BMPs)	Structural, nonstructural, and managerial techniques that are effective and practical means to control nonpoint source pollutants.
Biochemical Oxygen Demand (BOD)	The amount of dissolved oxygen used by organisms during the decomposition (respiration) of organic matter, expressed as mass of oxygen per volume of water, over some specified period of time.
Biota	The animal and plant life of a given region.
Biotic	A term applied to the living components of an area.
Clean Water Act (CWA)	The Federal Water Pollution Control Act (Public Law 92-50, commonly known as the Clean Water Act), as last reauthorized by the Water Quality Act of 1987 (Public Law 100-4), establishes a process for states to use to develop information on, and control the quality of, the nation's water resources.

Coliform Bacteria	A group of bacteria predominantly inhabiting the intestines of humans and animals but also found in soil. Coliform bacteria are commonly used as indicators of the possible presence of pathogenic organisms (also see Fecal Coliform Bacteria).
Colluvium	Material transported to a site by gravity.
Community	A group of interacting organisms living together in a given place.
Conductivity	The ability of an aqueous solution to carry electric current, expressed in micro (ì) mhos/cm at 25 °C. Conductivity is affected by dissolved solids and is used as an indirect measure of total dissolved solids in a water sample.
Criteria	In the context of water quality, numeric or descriptive factors taken into account in setting standards for various pollutants. These factors are used to determine limits on allowable concentration levels, and to limit the number of violations per year. EPA develops criteria guidance; states establish criteria.
Cubic Feet per Second	A unit of measure for the rate of flow or discharge of water. One cubic foot per second is the rate of flow of a stream with a cross-section of one square foot flowing at a mean velocity of one foot per second. At a steady rate, once cubic foot per second is equal to 448.8 gallons per minute and 10,984 acre-feet per day.
Erosion	of humans in deforestation, cultivation of the land, overgrazing, and disturbance of natural drainages; the excess of erosion over the normal for an area (also see Erosion).
Discharge	The amount of water flowing in the stream channel at the time of measurement. Usually expressed as cubic feet per second (cfs).
Dissolved Oxygen (DO)	The oxygen dissolved in water. Adequate DO is vital to fish and other aquatic life.
Disturbance	Any event or series of events that disrupts ecosystem, community, or population structure and alters the physical environment.

E. coli	Short for *Escherichia Coli*, *E. coli* are a group of bacteria that are a subspecies of coliform bacteria. Most *E. coli* are essential to the healthy life of all warm-blooded animals, including humans. Their presence is often indicative of fecal contamination.
Effluent	A discharge of untreated, partially treated, or treated wastewater into a receiving water body.
Endangered Species	Animals, birds, fish, plants, or other living organisms threatened with imminent extinction. Requirements for declaring a species as endangered are contained in the Endangered Species Act.
Environment	The complete range of external conditions, physical and biological, that affect a particular organism or community.
Eocene	An epoch of the early Tertiary period, after the Paleocene and before the Oligocene.
Erosion	The wearing away of areas of the earth's surface by water, wind, ice, and other forces.
Exceedance	A violation (according to DEQ policy) of the pollutant levels permitted by water quality criteria.
Existing Beneficial Use or Existing Use	A beneficial use actually attained in waters on or after November 28, 1975, whether or not the use is designated for the waters in Idaho's *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02).
Fauna	Animal life, especially the animals characteristic of a region, period, or special environment.
Feedback Loop	In the context of watershed management planning, a feedback loop is a process that provides for tracking progress toward goals and revising actions according to that progress.
Flow	See Discharge.
Fluvial	In fisheries, this describes fish whose life history takes place entirely in streams but migrate to smaller streams for spawning.

Fully Supporting	In compliance with water quality standards and within the range of biological reference conditions for all designated and exiting beneficial uses as determined through the *Water Body Assessment Guidance* (Grafe et al. 2000).
Fully Supporting Cold Water	Reliable data indicate functioning, sustainable cold water biological assemblages (e.g., fish, macroinvertebrates, or algae), none of which has been modified significantly beyond the natural range of reference conditions (EPA 1997).
Geographical Information Systems (GIS)	A georeferenced database.
Geometric Mean	A back-transformed mean of the logarithmically transformed numbers often used to describe highly variable, right-skewed data (a few large values), such as bacterial data.
Gradient	The slopes of the land, water, or streambed surface.
Ground Water	Water found beneath the soil surface saturating the layer in which it is located. Most ground water originates as rainfall, is free to move under the influence of gravity, and usually emerges again as stream flow.
Habitat	The living place of an organism or community.
Headwater	The origin or beginning of a stream.
Hydrologic Basin	The area of land drained by a river system, a reach of a river and its tributaries in that reach, a closed basin, or a group of streams forming a drainage area (also see Watershed).
Hydrologic Unit	One of a nested series of numbered and named watersheds arising from a national standardization of watershed delineation. The initial 1974 effort (USGS 1987) described four levels (region, subregion, accounting unit, cataloging unit) of watersheds throughout the United States. The fourth level is uniquely identified by an eight-digit code built of two-digit fields for each level in the classification. Originally termed a cataloging unit, fourth field hydrologic units have been more commonly called subbasins. Fifth and sixth field hydrologic units have since been delineated for much of the country and are known as watershed and subwatersheds, respectively.

Hydrologic Unit Code (HUC)	The number assigned to a hydrologic unit. Often used to refer to fourth field hydrologic units.
Hydrology	The science dealing with the properties, distribution, and circulation of water.
Impervious	Describes a surface, such as pavement, that water cannot penetrate.
Key Watershed	A watershed that has been designated in Idaho Governor Batt's *State of Idaho Bull Trout Conservation Plan* (1996) as critical to the long-term persistence of regionally important trout populations.
Load Allocation (LA)	A portion of a water body's load capacity for a given pollutant that is given to a particular nonpoint source (by class, type, or geographic area).
Load(ing)	The quantity of a substance entering a receiving stream, usually expressed in pounds or kilograms per day or tons per year. Loading is the product of flow (discharge) and concentration.
Loading Capacity (LC)	A determination of how much pollutant a water body can receive over a given period without causing violations of state water quality standards. Upon allocation to various sources, and a margin of safety, it becomes a total maximum daily load.
Loam	Refers to a soil with a texture resulting from a relative balance of sand, silt, and clay. This balance imparts many desirable characteristics for agricultural use.
Macroinvertebrate	An invertebrate animal (without a backbone) large enough to be seen without magnification and retained by a 500ìm mesh (U.S. #30) screen.
Margin of Safety (MOS)	An implicit or explicit portion of a water body's loading capacity set aside to allow the uncertainly about the relationship between the pollutant loads and the quality of the receiving water body. This is a required component of a total maximum daily load (TMDL) and is often incorporated into conservative assumptions used to develop the TMDL (generally within the calculations and/or models). The MOS is not allocated to any sources of pollution.
Mass Wasting	A general term for the down slope movement of soil and rock material under the direct influence of gravity.

Mean	Describes the central tendency of a set of numbers. The arithmetic mean (calculated by adding all items in a list, then dividing by the number of items) is the statistic most familiar to most people.
Median	The middle number in a sequence of numbers. If there are an even number of numbers, the median is the average of the two middle numbers. For example, 4 is the median of 1, 2, 4, 14, 16; and 6 is the median of 1, 2, 5, 7, 9, 11.
Metric	1) A discrete measure of something, such as an ecological indicator (e.g., number of distinct taxon). 2) The metric system of measurement.
Milligrams per Liter (mg/l)	A unit of measure for concentration in water, essentially equivalent to parts per million (ppm).
Million gallons per day (MGD)	A unit of measure for the rate of discharge of water, often used to measure flow at wastewater treatment plants. One MGD is equal to 1.547 cubic feet per second.
Miocene	Of, relating to, or being an epoch of, the Tertiary between the Pliocene and the Oligocene periods, or the corresponding system of rocks.
Monitoring	A periodic or continuous measurement of the properties or conditions of some medium of interest, such as monitoring a water body.
Mouth	The location where flowing water enters into a larger water body.
National Pollution Discharge Elimination System (NPDES)	A national program established by the Clean Water Act for permitting point sources of pollution. Discharge of pollution from point sources is not allowed without a permit.
Natural Condition	A condition indistinguishable from that without human-caused disruptions.

Nonpoint Source	A dispersed source of pollutants generated from a geographical area when pollutants are dissolved or suspended in runoff and then delivered into waters of the state. Nonpoint sources are without a discernable point or origin. They include, but are not limited to, irrigated and non-irrigated lands used for grazing, crop production, and silviculture; rural roads; construction and mining sites; log storage or rafting; and recreation sites.
Not Assessed (NA)	A concept and an assessment category describing water bodies that have been studied, but are missing critical information needed to complete an assessment.
Not Attainable	A concept and an assessment category describing water bodies that demonstrate characteristics that make it unlikely that a beneficial use can be attained (e.g., a stream that is dry but designated for salmonid spawning).
Not Fully Supporting	Not in compliance with water quality standards or not within the range of biological reference conditions for any beneficial use as determined through the *Water Body Assessment Guidance* (Grafe et al. 2000).
Not Fully Supporting Cold Water	At least one biological assemblage has been significantly modified beyond the natural range of its reference condition (EPA 1997).
Organic Matter	Compounds manufactured by plants and animals that contain principally carbon.
Parameter	A variable, measurable property whose value is a determinant of the characteristics of a system; e.g., temperature, dissolved oxygen, and fish populations are parameters of a stream or lake.
pH	The negative $\log_{10}$ of the concentration of hydrogen ions, a measure which in water ranges from very acid (pH=1) to very alkaline (pH=14). A pH of 7 is neutral. Surface waters usually measure between pH 6 and 9.

Phased TMDL	A total maximum daily load (TMDL) that identifies interim load allocations and details further monitoring to gage the success of management actions in achieving load reduction goals and the effect of actual load reductions on the water quality of a water body. Under a phased TMDL, a refinement of load allocations, waste load allocations, and the margin of safety is planned at the outset.
Point Source	A source of pollutants characterized by having a discrete conveyance, such as a pipe, ditch, or other identifiable "point" of discharge into a receiving water. Common point sources of pollution are industrial and municipal wastewater.
Pollutant	Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.
Pollution	A very broad concept that encompasses human-caused changes in the environment which alter the functioning of natural processes and produce undesirable environmental and health effects. This includes human-induced alteration of the physical, biological, chemical, and radiological integrity of water and other media.
Population	A group of interbreeding organisms occupying a particular space; the number of humans or other living creatures in a designated area.
Protocol	A series of formal steps for conducting a test or survey.
Qualitative	Descriptive of kind, type, or direction.
Quantitative	Descriptive of size, magnitude, or degree.
Reach	A stream section with fairly homogenous physical characteristics.
Reconnaissance	An exploratory or preliminary survey of an area.
Reference	A physical or chemical quantity whose value is known, and thus is used to calibrate or standardize instruments.

Reference Condition 1) A condition that fully supports applicable beneficial uses with little affect from human activity and represents the highest level of support attainable. 2) A benchmark for populations of aquatic ecosystems used to describe desired conditions in a biological assessment and acceptable or unacceptable departures from them. The reference condition can be determined through examining regional reference sites, historical conditions, quantitative models, and expert judgment (Hughes 1995).

Reference Site A specific locality on a water body that is minimally impaired and is representative of reference conditions for similar water bodies.

Resident A term that describes fish that do not migrate.

Riffle A relatively shallow, gravelly area of a streambed with a locally fast current, recognized by surface choppiness. Also an area of higher streambed gradient and roughness.

Riparian Associated with aquatic (stream, river, lake) habitats. Living or located on the bank of a water body.

Riparian Habitat Conservation Area (RHCA) A U.S. Forest Service description of land within the following number of feet up-slope of each of the banks of streams:
- 300 feet from perennial fish-bearing streams
- 150 feet from perennial non-fish-bearing streams
- 100 feet from intermittent streams, wetlands, and ponds in priority watersheds.

River A large, natural, or human-modified stream that flows in a defined course or channel, or a series of diverging and converging channels.

Runoff The portion of rainfall, melted snow, or irrigation water that flows across the surface, through shallow underground zones (interflow), and through ground water to creates streams.

Sediments Deposits of fragmented materials from weathered rocks and organic material that were suspended in, transported by, and eventually deposited by water or air.

Species 1) A reproductively isolated aggregate of interbreeding organisms having common attributes and usually designated by a common name. 2) An organism belonging to such a category.

Stream	A natural watercourse containing flowing water, part of the year. Together with dissolved and suspended materials, a stream normally supports communities of plants and animals within the channel and the riparian vegetation zone.
Stream Order	Hierarchical ordering of streams based on the degree of branching. A first-order stream is an unforked or unbranched stream. Under Strahler's (1957) system, higher order streams result from the joining of two streams of the same order.
Subbasin	A large watershed of several hundred thousand acres. This is the name commonly given to 4^{th} field hydrologic units (also see Hydrologic Unit).
Subbasin Assessment (SBA)	A watershed-based problem assessment that is the first step in developing a total maximum daily load in Idaho.
Subwatershed	A smaller watershed area delineated within a larger watershed, often for purposes of describing and managing localized conditions. Also proposed for adoption as the formal name for 6^{th} field hydrologic units.
Surface Water	All water naturally open to the atmosphere (rivers, lakes, reservoirs, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other collectors that are directly influenced by surface water.
Suspended Sediments	Fine material (usually sand size or smaller) that remains suspended by turbulence in the water column until deposited in areas of weaker current. These sediments cause turbidity and, when deposited, reduce living space within streambed gravels and can cover fish eggs or alevins.
Threatened Species	Species, determined by the U.S. Fish and Wildlife Service, which are likely to become endangered within the near future throughout all or a significant portion of their range.

Total Maximum Daily Load (TMDL)	A TMDL is a water body's loading capacity after it has been allocated among pollutant sources. It can be expressed on a time basis other than daily if appropriate. Sediment loads, for example, are often calculated on an annual basis. TMDL = Loading Capacity = Load Allocation + Waste Load Allocation + Margin of Safety. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.
Total Suspended Solids (TSS)	The dry weight of material retained on a filter after filtration. Filter pore size and drying temperature can vary. American Public Health Association Standard Methods (Greenborg, Clescevi, and Eaton 1995) call for using a filter of 2.0 micron or smaller; a 0.45 micron filter is also often used. This method calls for drying at a temperature of 103-105 °C.
Tributary	A stream feeding into a larger stream or lake.
Turbidity	A measure of the extent to which light passing through water is scattered by fine suspended materials. The effect of turbidity depends on the size of the particles (the finer the particles, the greater the effect per unit weight) and the color of the particles.
Waste Load Allocation (WLA)	The portion of receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. Waste load allocations specify how much pollutant each point source may release to a water body.
Water Body	A stream, river, lake, estuary, coastline, or other water feature, or portion thereof.
Water Column	Water between the interface with the air at the surface and the interface with the sediment layer at the bottom. The idea derives from a vertical series of measurements (oxygen, temperature, phosphorus) used to characterize water.
Water Pollution	Any alteration of the physical, thermal, chemical, biological, or radioactive properties of any waters of the state, or the discharge of any pollutant into the waters of the state, which will or is likely to create a nuisance or to render such waters harmful, detrimental, or injurious to public health, safety, or welfare; to fish and wildlife; or to domestic, commercial, industrial, recreational, aesthetic, or other beneficial uses.

Water Quality	A term used to describe the biological, chemical, and physical characteristics of water with respect to its suitability for a beneficial use.
Water Quality Criteria	Levels of water quality expected to render a body of water suitable for its designated uses. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, or industrial processes.
Water Quality Limited	A label that describes water bodies for which one or more water quality criterion is not met or beneficial uses are not fully supported. Water quality limited segments may or may not be on a 303(d) list.
Water Quality Limited Segment (WQLS)	Any segment placed on a state's 303(d) list for failure to meet applicable water quality standards, and/or is not expected to meet applicable water quality standards in the period prior to the next list. These segments are also referred to as "303(d) listed."
Water Quality Standards	State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.
Watershed	1) All the land which contributes runoff to a common point in a drainage network, or to a lake outlet. Watersheds are infinitely nested, and any large watershed is composed of smaller "subwatersheds." 2) The whole geographic region which contributes water to a point of interest in a water body.
Water Body Identification Number (WBID)	A number that uniquely identifies a water body in Idaho ties in to the Idaho Water Quality Standards and GIS information.
Wetland	An area that is at least some of the time saturated by surface or ground water so as to support with vegetation adapted to saturated soil conditions. Examples include swamps, bogs, fens, and marshes.
Young of the Year	Young fish born the year captured, evidence of spawning activity.